BLUMER (G.)

Tuberculosis of the Stomach.

WITH A REPORT OF A CASE OF MULTIPLE TUBERCULOUS ULCERS OF THAT ORGAN.

By GEORGE BLUMER, M. D.

From the Bender Hygienic Laboratory, Albany, N. Y.

Reprinted from the ALBANY MEDICAL ANNALS of March, 1898.

presented by the author

From the Albany Medical Annals, March, 1898.

TUBERCULOSIS OF THE STOMACH,*

WITH A REPORT OF A CASE OF MULTIPLE TUBERCULOUS ULCERS OF THAT ORGAN.

By GEORGE BLUMER, M. D.

From the Bender Hygienic Laboratory, Albany, N. Y.

Though there have been a number of cases of tuberculosis of the stomach published within the last few years, the well-authenticated cases in which not only a microscopic examination, but also the demonstration of the tubercle bacillus, has been made, are still relatively scarce. The incidence of stomach implication in tuberculosis has doubtless been greatly exaggerated by some of the older writers, Rilliet and Barthez for example, who claimed to have found stomach ulceration in 21 out of 141 cases of tuberculosis. More recent statistics show the number of cases to be much smaller, Dürck having seen only four cases in 900 autopsies, and Letulle only having observed the condition once in 108 autopsies on tuberculous subjects. In experimental work the condition seems to be more frequent, as Orth, in his work on ingestion tuberculosis, observed tuberculous stomach ulcer in one out of seven guinea pigs.

In looking over the available literature we have been able to collect only thirty reliable cases, and in many of these there was of necessity no examination for tubercle bacilli, as the observations were made before the discovery of this organism. It is hardly necessary to state that the cases are all secondary to some pre-existing tuberculous lesion elsewhere. Eppinger, indeed, seems to regard his cases as perhaps primary, but his description hardly supports this view.

The cases naturally group themselves under one of three heads: (1) Cases of miliary tuberculosis of the stomach; (2) cases where single ulcerations existed; (3) cases of multiple ulceration.

The cases of pure miliary tuberculosis are quite rare, the most

* Read before the Albany County Medical Society, February 16, 1898.

satisfactory being that described by Wilms. One of Kühl's cases and one described by Barth belong to this category, and Letulle's case in all probability originated as one of miliary tubercle of the stomach wall.

Single ulcers, in which both careful histological and bacteriological examinations were made, are reported by Musser and Dürck. Habershon reports a case in which no histological examination was made, but many tubercle bacilli were found in the scrapings from the caseous floor of the ulcer. Cases of single ulcer in which a satisfactory histological examination was made, but in which there was no examination for tubercle bacilli, are reported by Pozzi, Hattute, Letorey, Litten, and others. The single ulcers reported by Beadles and Lorey must be regarded as doubtful, as these authors give no satisfactory description of the microscopical appearances. The case of Pozzi has been included by Hamilton in this doubtful class of cases, but as the microscopic examination in this case was made by so eminent an authority as Cornil, the case may be considered with those in which a full microscopic description was given.

Multiple ulcers identified by the strictest requirements have been described by Coats, Letulle and Hamilton. Other cases in which the microscopical examination is complete, but in which no examination for tubercle bacilli was made, are recorded by Barbacci, Mathieu, and others.

Many cases are found in the literature in which the description of the ulcer is so vague that no definite conclusion as to its nature can be arrived at. To this group belong the cases of Chvostek, Lange, Labadie-Lagrave, Hanau, Paulicki, Barlow, and Hebb (second case).

Before discussing certain points in connection with the origin of the ulcers, I wish to report a new case.

The case occurred in the private practice of Dr. George E. Gorham, of Albany, N. Y., for whom the autopsy was made.

Mrs. S., a woman of about 50 years of age, died after a somewhat protracted illness, having the clinical appearance of typhoid fever. During life she had at no time definite stomach symptoms of any kind. The autopsy was made ten hours after death. The main lesions found were an old caseous area at the apex of the right lung, which had softened at its lower part, general miliary

tuberculosis, tuberculous ulcers of the stomach and ileum, tuberculosis of the kidneys and tuberculosis of the aorta.

The following description of the stomach is abstracted from the autopsy protocol:

"The stomach is much dilated, and contains dark greenish material. The walls are thin, the mucous membrane is thin and pale. Near the greater curvature, over the mid-portion of the organ, are three or four small circular ulcerations; they are from four to six millimeters in diameter, and have slightly raised edges, a little yellower in color than the surrounding mucous membrane. Their bases are smooth and clean. The ulcers are shallow, and do not apparently pass through the mucosa. Over other parts of the middle zone of the stomach are seen beneath the mucosa pin-head sized yellow nodules. Their yellow color is perhaps apparent, and due to the bile-staining of the overlying mucosa.

"*Microscopic.* — The mucous membrane of the organ is atrophied, this condition being much more marked in some portions than in others. The gland structures seem smaller than normal, many of the gland cells having a shrunken appearance. Aside from the tubercular lesions, two other changes are to be seen in the mucosa: (1) An increase in the connective tissue between the glands; (2) the occurrence of collections of round cells in numerous places. The increase in connective tissue occurs in the form of a fairly diffuse thickening of the normal interglandular tissue by fully formed fibrous tissue.

"The cellular collections are quite numerous, as many as three or four being at times present in the same section. These collections occur in the mucosa alone, involving its whole thickness, and are almost invariably in intimate relation with diseased vessels. The infiltrating cells are for the most part of the ordinary lymphoid type, and are arranged either as quite definite, almost round nodules, or more commonly simply as an irregular interglandular infiltration. In some instances the glandular structures are still to be made out between the cells, but very often they have completely disappeared. The vessels supplying these areas are situated at the junction of the mucosa with the muscularis mucosæ; they invariably show great thickening of their coats with partial or complete obliteration of their lumen. This thick-

ening is due to the presence in the vessel wall of a pink-staining refractive material, which strongly resembles amyloid, but which does not give the chemical reactions of this substance, and is presumably hyaline. These nodules do not at all resemble the tubercular lesions, and no tubercle bacilli are to be made out in them.

" The tubercular lesions exist either as miliary tubercles or as superficial ulcerations. The miliary tubercles are situated beneath the mucous membrane in the submucosa. They are only seen in the neighborhood of the ulcerations, are small, and present the usual appearances of tubercle nodules. They are made up of epithelioid and lymphoid cells, the former predominating in the centre, the latter in the periphery of the nodules. An occasional giant cell of the Langhans type is to be seen in them. In sections stained with carbo-fuchsin a few tubercle bacilli can be made out, either in the giant cells or in the body of the tubercle nodules.

" The ulcerations are seen to be confined to the mucosa. They are moderately shallow, the deepest not extending through more than half the depth of this coat. The tissues around the ulcers can be divided into three zones: A very narrow internal zone, corresponding to the sides and floor of the ulcer, and made up of necrotic material containing a few nuclear fragments; a middle zone, composed almost entirely of epithelioid cells; and an outer zone of lymphoid cells. In the zone of epithelioid cells an occasional giant cell is to be made out. In some places, where the tubercular process does not extend entirely through the mucosa, the vessels just beneath the tubercular infiltration show considerable thickening of their walls. No thrombi were seen in the vessels in the immediate neighborhood of the tubercular areas. On staining sections with carbo-fuchsin, very large numbers of tubercle bacilli could be made out in the cellular areas forming the walls of the ulcers, particularly in the zone of epithelioid cells. The bacilli often occurred in the cells, at times between them; usually they were evenly distributed through the section, but in one or two places they were massed together in lines extending from the surface to the base of the ulcer. In one instance such a line seemed to correspond to the remains of a gastric tubule, and the appearance suggested that the bacilli were situated in the remains of the gland cavity."

The question which has always aroused most interest in connection with tuberculosis of the stomach has been the great immunity of the organ to the tuberculous process. Two main hypotheses have been brought forward to account for this: First, the antagonistic action of the gastric juice, and secondly, the absence of definite lymphatic structures from the stomach. With regard to the action of the gastric juice toward the tubercle bacilli, it may be stated that the experiments of Wesener, of Falk, and of Straus and Wurtz have all shown that the gastric juice acts very slowly upon this bacillus. The experiments of Falk and Wesener were made by introducing tuberculous material into an artificial gastric juice and leaving it there for some hours, after which it was inoculated into animals and shown not to have lost its virulence. The experiments of Straus and Wurtz were made by subjecting pure cultures of the tubercle bacillus (containing spores?) to the action of the gastric juice of the dog. These observers showed that in some instances the bacilli retained their virulence after an exposure of 18 hours. It can easily be understood that in these latter experiments the bacilli were in much more unfavorable surroundings than they would be under natural circumstances, where the gastric juice would be diluted by admixture with food, and the bacilli protected by the substances containing them. It can be conceived that under normal conditions the bacilli, though not killed by the gastric juice in their passage through the stomach with the food, could be inhibited from developing in that organ itself, on account of their frequent, though intermittent, exposure to the secretions. Some recent writers seem to infer that because the bacilli are capable of resisting the action of stomach juice for some time, they are able to develop even in a healthy gastric mucous membrane; they do not seem to take into account that the bacilli might be subjected to repeated exposure before they could gain a foothold. In connection with this it may be asked whether in any of the reported cases lesions of the stomach were present such as would decrease or entirely suppress the secretion of gastric juice. In our case an undoubted atrophy of the mucosa was present, and in other reported cases the description leaves no doubt that chronic gastritis existed, as well as the tubercular ulceration. Lebert has asserted that catarrhal affections of the stomach exist in one-fifth

of the patients sufferings from tuberculosis. In all these conditions the amount of free hydrochloric acid may be diminished or entirely absent, and, as Straus has shown, the action of the stomach juice on the bacillus is due to its acidity, and not to any digestive action, for a simple watery solution of hydrochloric acid of the same strength as stomach juice has the same effect.

With regard to the absence of lymphoid apparatus in the stomach as protecting against attacks of the tubercle bacillus, it may be said that, though many authors put this theory forward, on account of the fact that in the intestine the lymphoid apparatus is attacked first, none of them bring any definite evidence either for or against it. In the case just reported there were present in the mucosa many collections of cells of a lymphoid type, presumably corresponding to similar collections observed by other authors, Dobrowolski, for instance, in connection with chronic gastritis; in no instance were any tubercle bacilli found in such cellular collections, nor was there the slightest histological evidence of tubercular invasion.

There remains to be considered the connection of certain of these ulcers with disturbances of the blood supply.

It is assumed that in cases of miliary tuberculosis of the stomach the blood is the carrier of the infection to the stomach, as to the other organs, but besides these cases of certain blood infection there are others, particularly cases of multiple superficial ulcerations, which have been assumed to have an origin in disturbances of the circulation. Eppinger, in reporting his cases, suggests the possibility of their relation to the ordinary hemorrhagic erosions of the stomach, and Hamilton, in her paper, again brings forward this suggestion. According to this conception the erosions would act by causing a lesion upon which the tubercle bacillus could become grafted. That such a sequence of events is possible as the result of an injury to the mucosa is proved by the case of Breus. The case was that of an individual with chronic tuberculosis of the lungs, who swallowed a corrosive alkali with suicidal intent. He recovered from the effects of the poison, but at his death from tuberculosis, four weeks later, numerous ulcers were found in the contracted stomach, in the margins of which definite tubercles containing giant cells were found. Besides hemorrhagic erosions, it is conceivable that other

circulatory disturbances might give rise to similar predisposing conditions. Hanau suggests an embolic origin, and in our case there was present in places in the vessels beneath the tubercular ulcers a sufficient contraction of the lumen of the blood vessels to considerably decrease the blood supply, though this change might have followed and not preceded the tuberculous process.

The larger single ulcers would not seem, as a rule, to originate in the same way as the multiple ones. A few are evidently due to extension of the process from an adherent tuberculous lymph gland external to the organ; others are, perhaps, as Dürck believes, secondary to a tuberculous process in the serous coat, and still others may be due, as Klebs suggests, to the inoculation of tubercle bacilli into a simple ulcer. As simple ulcer is not uncommon in tubercular subjects, and as it has already been shown that such inoculation may occur after injury, it seems not at all unlikely that this is sometimes the case.

The following conclusions may be formulated with regard to the factors favoring the development of tubercular stomach ulcers:

1. The acidity of the gastric juice as a factor in preventing the action of the tubercle bacillus on the stomach mucosa has been largely over-estimated by the older writers, but perhaps under-estimated in recent years. Whilst under healthy conditions of the mucous membrane it is probably sufficient to prevent the development of the tubercle bacillus, it is probably insufficient where a local point of lessened resistance occurs.

2. There is no proof that the lack of lymphoid material in the gastric mucosa bears any relation to the rarity of gastric tuberculosis.

3. In multiple tubercular ulceration of the stomach vascular disturbance either in the form of hemorrhagic erosions or of some factor interfering with the blood supply of a part of the mucosa in all probability plays an important rôle. This probably acts by creating an area of lessened resistance, and as has been shown, such an area is liable to tuberculous invasion.

4. Large single tuberculous ulcers are probably due to direct extension from tuberculous lesions external to the stomach, to extension from the serous coat of the organ, or to the inoculation of tuberculous material on a pre-existing simple ulcer.

A table of the reported cases of tuberculous ulcer is appended. Besides the cases included in this table, there are five reported by Przewosky, but the original article could not be obtained, and the abstracts did not give much detail. Dürck speaks of the cases as if tubercle bacilli had been found in the ulcers, and Wilms mentions that most of the ulcers were single and situated near the pylorus. The case of Serafini likewise was not obtainable.

An analysis of the cases contained in the table brings out the following figures:

Relation of the ulcers to sex:

Cases in which sex is mentioned..... 18

Male	14
Female	4
	18

Relation of the ulcers to age:

Cases in which age is mentioned..... 19

2 cases occurred between	5 - 10 years.
4 cases occurred between	10 - 20 years.
1 case occurred between	20 - 30 years.
6 cases occurred between	30 - 40 years.
3 cases occurred between	40 - 50 years.
3 cases occurred between	50 - 60 years.
19	

Situation of ulcers:

Cases in which situation of ulcers is mentioned.. 18

Pyloric end	4
Cardiac end	1
Greater curvature	3
Lesser curvature	6
Distribution over stomach in general	4
	18

Number of ulcers:

Number of cases in which number of ulcers is mentioned 24

Single	12
Multiple	12
	24

The character of the ulcers was so diverse that it can best be made out by referring to the individual cases.

14 Jay Street.

Bibliography.

Barbacci — Cited by Hamilton.
Barlow — *Trans. Path. Soc., London*, 1887.
Barth — Cited by Hamilton.
Beadles — *British Medical Journal*, 22, 1892.
Bignon — Cited by Cazin.
Breus — *Wiener Medicin. Woch.*, No. 11, 1878.
Cazin — *Soc. Medicale des Hopit. de Paris*, 1880.
Chvostek — *Wiener Medicin. Blätter*, 1882.
Coats — *Glasgow Med. Journal*, 1886.
Dobrowolski — *Lubarsch and Ostertag's Ergebnisse*, 3*d Abteilung*, 1896.
Dürck — *Lubarsch and Ostertag's Ergebnisse*, 1895.
Eppinger — *Prager Medicin. Woch.*, 1881.
Falk — *Vichow's Archiv.*, 1893.
Gille-Bréchemin — *Bull. de la Soc. Anat. de Paris*, 1879.
Habershon — *Trans. Path. Soc., London*, 1894.
Hamilton — *Johns Hopkins Hosp. Bull.*, 1897.
Hanau — *Virchow's Archiv.*, bd. 108, 1887.
Hattute — *Gazette des Hopitaux*, 1874.
Hebb — *Westminster Hospital Reports*, 1888.
Kühl — Cited by Hamilton.
Labadie-Lagrave — *Bull. de la. Soc. Anat. de Paris*, 1870.
Lange — *Memorabilien, Heilbronn*, 1871.
Lava — Cited by Hamilton.
Lebert — Cited by Spillman.
Letorey — Thesis. Paris, 1895.
Letulle — *Bull. de la Soc. Anat. de Paris*, 1893.
Litten — *Virchow's Archiv.*, 1876.
Lorey — *Bull. de la. Soc. Anat. de Paris*, 1874.
Mathieu — *Bull. de la Soc. Anat. de Paris*, 1881.
Musser — *Philadelphia Hospital Reports*, 1890.
Orth — *Virchow's Archiv.*, bd. 76.
Paulicki — *Berliner Klin. Woch.*, 1867.
Pozzi — *Bull. de la. Soc. Anat. de Paris*, 1868.
Przewsoky — See Dürck and Wilms.
Rilliet and Barthez — Cited by Musser.
Serafini — *Annal. Clin. del. Osp. di Napoli*, 1888.
Straus — *La Tuberculose et Son Bacille*, Paris, 1895.
Straus and Wurz — *Congrès de la Tuberculose*, 1888.
Talamon — Cited by Cazin.
Weigert — *Virchow's Archiv.*, 1882.
Wesener — Cited by Straus.
Wilms — *Centralb. f. Allgemeine Path., etc.*, bd. 8, 1897.

TABLE OF CASES OF TUBERCULOUS ULCER OF THE STOMACH.

Name of observer.	Number of ulcers.	Situation of ulcer.	Character.	Histological.	Tubercle bacilli.	Sex.	Age.
Musser.	One.	Lesser curvature 1⅛ in. from pylorus.	3 in. x 1⅛ in. oval—floor cribriform—extends at places to perit. coat. Tubercles in floor.	Usual appearance of tuberculous tissue.	Present.	Male.	44
Dürck.	One.	Lesser curvature.	Size of 5 mark piece.	Not mentioned.	Large numbers in sections.	Child.	10
Habershon.	One.	Middle of lesser curvature, post. surface.	Small, shallow, size of 3 penny piece, raised edges—caseous floor, perfectly circular.	Not mentioned.	Large numbers in scrapings from floor.	Male.	35
Pozzi.	One.	Not mentioned.	Circular—1½ c. m. in diameter—edges undermined.	Stated to be tubercular by Cornil.	Not mentioned.	Male.	39
Litten.	One.	Anterior wall near lesser curvature.	Elliptical, 4.2 x 3.3 c. m., long diameter across lesser curva. Wall sharp—in places swollen and hem. Tubercles to be made out on floor. Reaches to mus. coat.	Typical tubercles with giant cells.	Not mentioned.	Male.	30
Letorey.	One.	Near pylorus.	Diffuse ulceration.	Typical tubercular lesions.	Not mentioned.		
Gille-Brechemin.	One.	Not mentioned.	Size of 50 centime piece. Edges prominent. Base caseous.	Caseous tubercular nodules (Sabourin).	Not mentioned.	Male.	18
Hattute.	One.	Pylorus.	Surrounds pylorus as a hard ring; completely occluding orifice. M. M. destroyed in place. Ring made up of masses of granulations.	Elements of tubercle.	Not mentioned.	Male.	47
Cazin.	One.	Near cardia and lesser curv., post. surface.	Almost circular, size of 20 centime piece—walls undermined. Tubercles on floor. Base reaches mus. coat	Tubercles with giant cells.	Not mentioned.	Female.	10½
Bignon.	One.	Greater curvature.	Sharp, circular, size of 25 centime piece; one yellow tubercle beneath mucous membrane.	Tubercular nodules.	Not mentioned.	Male.	6½
Hebb.	One.	Lesser curvature 1½ in. from œsophagus.	Circular—diam. 1¼ in.—sharply defined, overhanging edges—indurated base. Tubercles on the floor.	Tubercles with giant cells.	Not mentioned.	Male.	40
Lava.	One.	Pylorus.	Not mentioned.	Tubercles with giant cells.	Not mentioned.	?	?
Coats.	A number.	Not mentioned.	Superficial—overhanging edges which are not very prominent—granular base. Tubercles on peritoneal surface.	Typical tuberculosis.	Many tubercle bacilli.	?	?
Lettulle.	Ten.	Not mentioned.	In form of small tumors size of nuts; ulcerated at surface.	Caseous tubercles with giant cells, submucous origin.	A few tuber. bacilli in.	?	?

10

Hamilton, Case 1.	115–120.	Mostly on ant. aspect nr. greater curvature.	Round in shape—smaller than a cent piece—edges rounded, thickened, smooth and undermined.	Epithelioid and lymphoid cells, necrosis—no giant cells.	A few tub. bacilli.	Female.	30
Case 2.	70–75.	Along greater curvature.	Small—edges worm eaten. Bases irregular and in places covered by granulations extending only partly through mucosa.	Infiltration with epith. and lymph. cells. Necrosis. One typical tubercle.	Many tubercle bacilli.	Male.	50
Case 3.	Two.	Bet. pylorus and cardia on post. wall nr. lesser curvature and in middle of lesser curvature.	Irregularly oval—edges raised, undermined, congested. Floor irregular. Tubercles (?) on floor.	Caseous tubercles with giant cells.	Many tubercle bacilli.	Female.	11
Breus.	Numerous.	Along curvature in neighborhood of fundus and pylorus.	Sharp, hard edges.	Tubercles with giant cells.	Not mentioned.	Male.	21
Talamon.	Seven.	Two at cardia. Three along greater curv. Two at pylorus.	Largest near cardia. Largest round and size of 5 sou piece. One almond sized and oval—edges undermined, prominent. Base gray—do not seem to extend beyond mucosa. Ulcers on lesser curv. deeper, diam. 5-6 m. m.	Tubercular; full and good account given.	Not mentioned.	Female.	4¼
Eppinger, Case 1.	Many.	Along lesser curv. to pylorus and also on anterior and posterior walls.	Hempseed size to those having Diam. of 1.5 c. m. Wall-like, pale, hard edges, which overhang—deep, yellow colored granular base—Do not extend beyond superficial mucosa.	Typical tubercles with giant cells.	Not mentioned.	Male.	30
Case 2.	Numerous.	At cardiac and pyloric ends, lesser curvature and on anterior and posterior walls.	Pea-sized—steep, wall-like hard edges—base deep, yellowish-white colored—also many irreg. ulcerations. Do not extend deeper than musculature.	Typical tubercles with giant cells.	Not mentioned.	Male.	55
Mathieu.	Many.	Not mentioned.	No gross description.	Caseous tubercles and tuberculous tissue infiltrating muscular coat.	Not mentioned.	Male.	58
Weigert.	Three.	Not mentioned.	Lentil-sized—round—surrounded by elevated edges—four discrete whitish nodules in floor.	Usual appearance of tubercle.	Not mentioned.	Male.	3[illegible]
Barbacci.	Five.	Near pylorus.	Two had diameter of 6 c. m.	Nodules of embryonic cells with caseous center.		?	?
Kuhl. Case 1.	?	?	?	Stated to be certainly tubercular by Hamilton	No.	?	?
Case 2.	?	?	?	Caseating nodules.	Yes.	?	?
Case 3.	?	?	?	Caseating nodules.	Yes	?	?

11

ALBANY MEDICAL ANNALS

Journal of the Alumni Association of the Albany Medical College.

EDITORS:

ANDREW MAC FARLANE, M. D.

J. MONTGOMERY MOSHER, M. D.

PUBLISHED MONTHLY.

Subscription Price, One Dollar Per Annum, in Advance.

The ALBANY MEDICAL ANNALS is published at Albany as the official organ of the Alumni Association of the Albany Medical College. It has the especial support of the Graduates, Faculty and Students of the College, is an exponent of all that is best in the past and present of the College, and is replete with the best work in medical science.

The ANNALS is divided into the following departments:

1. Original Papers.
2. Reports of Clinical and Pathological Cases.
3. Editorials.
4. Medical News and Items Referring to the Alumni of the College.
5. Medical Legislation.
6. Critical Review of the Scientific Progress of the Month.
7. Current Medical Literature.
8. Book Reviews.
9. Practical Therapeutics.

Each of these departments will be helpful, scientific and up to date.

Original articles, items of medical importance, correspondence upon topics of current interest are earnestly solicited.

Communications and subscriptions should be addressed,

ALBANY MEDICAL ANNALS,
Albany, N. Y.